

## **REMARKS**

Claims 1-23 and 25-29 are pending in this application. By this Amendment, claims 1, 4, 7, 9, 11, 12, 20-23, 25 and 27-29 are amended and claim 24 is canceled without prejudice or disclaimer. Reconsideration in view of the above amendments and following remarks is respectfully requested.

Applicant gratefully acknowledge the Office Action's indication that claims 4-7, 11-19, 22, 25 and 29 define allowable subject matter. However, for at least the reasons set forth below, Applicant respectfully submits that all pending claims are in condition for allowance.

### **I. Claim Objections**

The Office Action objects to claim 12. Applicant respectfully submits that the above amendments obviate the grounds for the objection. Withdrawal of the objection is respectfully requested.

### **II. 35 U.S.C. §112, second paragraph**

The Office Action rejects claims 1-20 and 28 under 35 U.S.C. §112, second paragraph. Applicant respectfully submits that the above amendments obviate the grounds for the rejection. Withdrawal of the rejection is respectfully requested.

### **III. 35 U.S.C. §102(e)**

The Office Action rejects claims 1-3, 8, 21, 23, 24, 26 and 27 under 35 U.S.C. §102(e) over Meyer (U.S. Patent No. 6,329,079) for the reasons stated on page 3 of the Office Action. The rejection is respectfully traversed.

However, Applicant respectfully submits that Meyer does not disclose or suggest (1) an iron aluminide alloy, and (2) an iron aluminide alloy with transition metal oxides in an amount effective to provide a coefficient of thermal expansion substantially the same as the coefficient of thermal expansion of a second material over the temperature range of ambient to about 1000°C.

First, Meyer does not disclose or suggest an iron aluminide alloy with a coefficient of thermal expansion substantially the same as the coefficient of thermal expansion of a second material over the temperature range of ambient to about 1000°C. Rather, Meyer merely discloses a liner of iron-aluminum alloy with 16 to 30% aluminum by weight, as mentioned in page 3 of the Office Action and Meyer, column 2, lines 56-60. However, iron-aluminum alloys are not necessarily iron aluminide alloys with coefficients of thermal expansion substantially the same as the coefficient of thermal expansion of a second material over the temperature range of ambient to about 1000°C.

Second, Meyer does not disclose or suggest an iron aluminide alloy with transition metal oxides. As mentioned in the Specification of the Application:

[i]ron aluminide, however, has an undesirably high coefficient of thermal expansion. For instance, if an iron aluminide is used as the interior protective lining of a cracking tube, the disparity of coefficients of thermal expansion between the outer tube material and the liner material can cause unequal volume expansion and create deleterious stresses in the mechanical and reaction systems. Therefore, it is desirable to provide the iron aluminide with high coking and carburization resistance as well as a coefficient of thermal expansion matched to the outer tube material of the cracking tube.

See page 6, paragraph [0020] of the Application.

Therefore, an iron aluminide material before alloying with transition metal oxides can have a disparity of coefficients of thermal expansion with an outer material of the cracking tube that can cause unequal volume expansion and create deleterious stresses. See the specification, page 6, paragraph [0020] of the Application.

Amended claim 1 recites a cracking tube comprising a first layer on an interior surface of the tube; and a second material surrounding the first layer, wherein the first layer is an iron aluminide alloy with transition metal oxides in an amount effective to provide a coefficient of thermal expansion substantially the same as the coefficient of thermal expansion of the second material over the temperature range of ambient to about 1000°C.

However, Meyer does not disclose or suggest the combination of features of amended claim 1. Meyer discloses a “liner 6 preferably derived from an iron-aluminum alloy – one having between 16% and 30% aluminum by weight and preferably about 22% aluminum by weight, with the balance being essentially iron.” See Meyer, col. 2, lines 56-59. However, Meyer does not disclose or suggest at least the feature of an iron aluminide alloy with transition metal oxides in an amount effective to provide a coefficient of thermal expansion substantially the same as the coefficient of thermal expansion of a second material over a temperature range of ambient to about 100°C.

Similar to claim 1, Meyer does not disclose or suggest at least the feature of an iron aluminide alloy with a transition metal oxides or the combination of features of claim 21. Also, claims 23 and 27 recite the feature of an iron aluminide alloy with transition metal oxides, which, along

with each of claims 23 and 27's combination of features, are not disclosed or suggested by Meyer.

For at least the reasons set forth above, Applicant respectfully submits that claims 1, 21, 23 and 27 are allowable. Claims 2, 3 and 8 depend from claim 1 and claim 26 depends from claim 23, and are allowable for at least the same reasons. Claim 24 has been canceled without prejudice or disclaimer, therefore the rejection of claim 24 is moot. Withdrawal of the rejection is respectfully requested.

#### **IV. 35 U.S.C. §103(a)**

##### **a. Claim 10**

The Office Action rejects claim 10 under 35 U.S.C. §103(a) over Meyer for the reasons stated on page 4 of the Office Action. The rejection is respectfully traversed.

Applicant respectfully submits that claim 10 depends from claim 1, and is allowable for at least the same reasons as well as its combination of features. Therefore, claim 10 is allowable. Withdrawal of the rejection is respectfully requested.

##### **b. Claims 9, 20 and 28**

The Office Action rejects claims 9, 20 and 28 under 35 U.S.C. §103(a) over Meyer in view of Mendez Acevedo et al. (U.S. Patent No. 6,475,647) for the reasons stated on pages 4-5 of the Office Action. The rejection is respectfully traversed.

Claims 9 and 20 depend from claim 1 and claim 28 depends from claim 27. As such, Applicant respectfully submits that Meyer does not disclose or suggest the combination of features within each of these claims.

Mendez Acevedo does not cure the deficiencies of Meyer. Mendez Acevedo does not disclose or suggest, as recited in claims 1 and 27, at least the feature of iron aluminum alloy with transition metal oxides in an amount effective to provide a coefficient of thermal expansion substantially the same as the coefficient of thermal expansion of a second material over a temperature range of ambient to about 1000°C, as well as the combinations of features in each claim.

For at least the reasons set forth above, Applicant respectfully submits that claims 9, 20 and 28 are allowable. Withdrawal of the rejection is respectfully requested.

#### CONCLUSION

From the foregoing, further and favorable action in the form of a Notice of Allowance is earnestly solicited. Should the Examiner feel that any issues remain, it is requested that the undersigned be contacted so that any such issues may be adequately addressed and prosecution of the instant application expedited.

Respectfully submitted,

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